

**Original Article**

**Efficacy of Cyriax Physiotherapy versus Cyriax and low level Laser Therapy on pain and grip strength in Lateral Epicondylitis**

*Sunita Sharma<sup>1</sup>, Nitin Gupta<sup>2</sup>, Sandeep Joshi<sup>3</sup>, Rosy Bala<sup>4</sup>, Ruby Sharma<sup>5</sup>*

**Abstract**

**Objective:** The study was designed to evaluate the efficacy of Cyriax physiotherapy versus Cyriax and Low Level Laser Therapy to compare these techniques in reducing pain and improving grip strength in patients with lateral epicondylitis. **Methodology:** The study population included 30 patients of lateral epicondylitis (signs and symptoms present for more than 6 weeks) diagnosed in outpatient and indoor facilities of MM Hospital, Mullana. The subjects were selected by means of simple random sampling. After fulfilling the inclusion and exclusion criteria, the patients were randomly allocated in two groups: Group A and Group B. Group A received cyriax physiotherapy alone whereas Group B patients were subjected to combined Cyriax and low level Laser therapy. Baseline measurements of pain and grip strength were taken before treatment and then at 3 weeks respectively. **Results:** Our findings showed that there was significantly higher improvement in pain and grip strength in Group B (patients receiving combination of cyriax therapy with low dose laser therapy) as compared to Group A ( $p < 0.05$ ). **Conclusion:** Cyriax physiotherapy and low level laser therapy were effective in reducing pain and improving grip strength after the treatment sessions. But benefits of cyriax physiotherapy with low level laser therapy in lateral epicondylitis patients are significantly higher as compared to cyriax physiotherapy alone over a three week period. Hence, cyriax with low level laser therapy is proved to be a better treatment.

**Keywords:** Cyriax physiotherapy; low level laser; lateral epicondylitis; handgrip strength; deep transverse friction

*Bangladesh Journal of Medical Science Vol. 20 No. 02 April'21. Page : 356-367  
DOI: <https://doi.org/10.3329/bjms.v20i2.51548>*

**Introduction:**

Lateral epicondylitis, commonly called “tennis elbow”, is an overuse injury of the wrist extensors leading to inflammation and ultimately degenerative changes such as tendinosis and micro-teared fibrous

tissue at these points. Lateral epicondylitis is 7 to 20 times more frequent than medial epicondylitis.<sup>1</sup> This injury is difficult to treat, is prone to recurrent bouts and may last for several weeks or months.<sup>2</sup> The dominant arm is commonly affected with the prevalence of 1-3% in general population, but

1. Sunita Sharma, Assistant Professor, Department of Physiotherapy, Maharishi Markandeshwar Institute of Medical Sciences & Research (Maharishi Markandeshwar Deemed to be University) Mullana, Ambala, Haryana, India.
2. Nitin Gupta, Associate Professor, Department of Medicine, Maharishi Markandeshwar Institute of Medical Sciences & Research (Maharishi Markandeshwar Deemed to be University) Mullana, Ambala, Haryana, India.
3. Sandeep Joshi, Professor, Department of Medicine, Maharishi Markandeshwar Institute of Medical Sciences & Research (Maharishi Markandeshwar Deemed to be University) Mullana, Ambala, Haryana, India.
4. Rosy Bala, Associate Professor, Department of Microbiology, Maharishi Markandeshwar Institute of Medical Sciences & Research (Maharishi Markandeshwar Deemed to be University) Mullana, Ambala, Haryana, India.
5. Ruby Sharma, Associate Professor, Department of Physiology, Maharishi Markandeshwar Institute of Medical Sciences & Research (Maharishi Markandeshwar Deemed to be University) Mullana, Ambala, Haryana, India.

**Correspondence to:** Dr. Nitin Gupta, Associate Professor, Department of General Medicine, Maharishi Markandeshwar Institute of Medical Sciences & Research (Maharishi Markandeshwar Deemed to be University) Mullana, Ambala, Haryana, India-134207. Email: [drnitintayal@gmail.com](mailto:drnitintayal@gmail.com)

this increases to 19% at 30-60 years of age.<sup>3</sup> Pain around lateral elbow is known by variety of names, periostitis, extensor carpi radialis brevis (ECRB) — tendinosis, epicondylgia, tennis elbow and lateral epicondylitis.<sup>4,5</sup>

The major aims in the management of tennis elbow are relief of pain, inflammation and microbleed, promotion of relief and rehabilitation, and prevention of recurrence. The useful modalities include cryotherapy in the acute stage followed by pain killers and other local physiotherapy techniques.<sup>[6]</sup>

#### **Material and Methods:**

A total of thirty patients were selected by means of simple random sampling based on inclusion and exclusion criteria with signs and symptoms of lateral epicondylitis for more than 6 weeks, diagnosed in outpatient and inpatient facilities of MM Hospital, Mullana.

**Procedure:** Subjects were informed about the purpose and procedure of the study prior to the participation and informed consent was taken from them. The patients were randomly allocated in two groups. Group A (n=15) received Cyriax physiotherapy and Group B (n=15) received Cyriax and Low Level Laser Therapy as treatment for 3 times a week for 3 weeks. Baseline measurements of pain and grip strength were taken before treatment and then at 3 weeks respectively.

#### **Procedure for measuring pain**

The pain was measured as per the standard scaling system called Numeric Pain Rating Scale. The patients were instructed to choose any number from 0 to 10 that best described their current pain. Zero rating would mean 'No pain' and ten would mean 'Worst possible pain'.

**Procedure for measuring grip strength** Handgrip Strength is a reliable indicator of estimating the human strength.<sup>7</sup> It can be used to monitor the muscular strength in various systemic and local musculoskeletal disorders. In this study, pain free dynamometric grip strength (force) data was collected with the arm at 30 degrees abduction, with the elbow resting on the treatment table and the wrist resting on the rolled towel 8 cms in diameter with the forearm being in neutral pronation - supination position. The patient was unable to see the face of dynamometer, which was read and recorded by the therapist. The readings were recorded in kgs. Three consecutive readings were taken and the mean was

calculated and documented as the grip strength in the pre, post and follow up grip strength measurements.

#### **Group A**

Group A received Cyriax physiotherapy at the junction of the extensor carpi radialis brevis. Cyriax physiotherapy includes deep transverse friction (DTF) in combination with Manipulation, which was performed immediately after DTF. For it to be considered a Cyriax intervention, the two components were used together in the order mentioned. The protocol was followed 3 times a week for 3 weeks.

#### **Technique of DTF Application**

The patient was positioned comfortably with the elbow fully supinated and in 90 degree of flexion. The anterolateral aspect of the lateral epicondyle was located (where the ECRB originates and is the most common site of pain in patients with lateral epicondylitis) and the area of tenderness was identified. DTF was applied with the side of the thumb tip applying the pressure in a posterior direction on the teno-osseous junction. This pressure was maintained while imparting DTF in a direction towards the therapist's fingers, which were positioned on the other side of the elbow for counter pressure. DTF was applied for 10 minutes. After the numbing effect was achieved, the tendon was prepared for Mill's manipulation.<sup>3</sup>

#### **Technique of Mill's manipulation**

It was performed immediately after the DTF, provided the patient had full range of passive elbow extension. Patient was positioned on chair with backrest and therapist stood behind the patient. Patient's arm was supported under the crook of elbow with shoulder joint abducted to 90 and medially rotated with forearm pronation.

Patient's wrist was fully flexed and forearm pronated by the therapist. Hand supporting the crook of elbow was moved on to the posterior surface of the elbow joint and while maintaining full wrist flexion and pronation, patient's elbow was extended until all the slack has been taken up in the tendon.

Therapist then stepped sideways to stand behind the patient's head, L taking care to prevent the patient from leaning away either forwards or sideways, which would reduce the tension on the tendon. Minimal amplitude, high velocity thrust was then applied by simultaneously side flexing therapist's body away from the arm and pushed smartly downwards with the hand over the patients elbow.<sup>8</sup>

The patients were also taught a graduated exercise therapy regimen including stretching exercises and progressive resisted exercises. The stretch was given at forearm pronated and elbow extended; the wrist being palmar flexed using the other hand of patient or with the help of wall. This was held for few seconds and then released. A total of 10 stretches were given per session. Progressive resisted exercises included isometric contractions with the elbow flexed to 90°, with the hand of unaffected arm applying manual resistance over the dorsum of the supinated arm of affected side. Pain free isometric contraction of the wrist extensors were initiated and held for 5 to 10 seconds. In one session 15 contractions were given. Progression included forearm pronation as the starting position and increasing resistance.<sup>9</sup>

**Group B**

Group B received Cyriax in addition to Low Level Laser Therapy at the tenoperiosteal junction of the extensor carpi radialis brevis The Mid 1500 IRRADIA laser machine was used, wavelength: 904 nm, mean power output: 12 mW, peak value: 8.3 W; frequency: 70 Hz (pulse train). Tender point was treated for 30 sec resulting in a dose of treatment of 0.36 J/point. The patients were treated 2–3 times weekly with 10 treatments in all for 3weeks.

**Data analysis**

The data analyzed using SPSS 20.0 software package. The statistical analysis for two groups were performed to find out the mean, standard deviation, p value, t value and the statistical significance between NPRS, grip strength in both groups. The paired sample t-test was used to compared the parameters within the groups. Unpaired sample t-test was used comparisons between the two groups. Level of significance was set at p <0.05.

**Results:**

Thirty subjects were recruited. 15 individuals participated in experimental group A which received Cyriax Physiotherapy while remaining 15 subjects participated in group B who received Cyriax physiotherapy with Low Level Laser Therapy. First we compared the age group of all the participants, and then within group and between group analyses were done in all the clinical parameters. There was no significant difference between the groups in terms of age and baseline measurements (Table 1 and 2) (p>0.05).

Table 3 and 4 compare the effect of both therapies

**Table- 1: Comparison of age value within group A and Group B**

Variables	Group A (Mean± SD)	Group B (Mean± SD)	t value	P value
AGE (yrs)	46.33±8.3637	46.4±7.0791	-0.023564	> 0.05

P-value > 0.05 was considered as non- significant. SD: Standard deviation

**Table -2: Comparison of baseline measurements of subjects**

Baseline Measurements	Group A (Mean± S.D)	Group B (Mean± S.D)	t value	P value
NPRS (Cm)	7.4 ± 1.121224	7.6 ± 0.828079	0.555719	> 0.05
GRIP STRENGTH (Kg.)	15.133 ± 0.990	15 ± 1.195229	0.3326739	> 0.05

SD: Standard deviation, cm: centimeters, Kg: kilograms, **Group A:** Cyriax physiotherapy, **Group B:** Cyriax physiotherapy with Low Level Laser Therapy

**Table-3: Comparison of pre and post NPRS within group A and group B**

Group		Mean	S.D.	t value	P value
Group A	Pre NPRS	7.4	1.12	-5.17	<0.05
	Post NPRS	4.4	0.91		
Group B	Pre NPRS	7.6	0.83	-11.52	<0.05
	Post NPRS	3.6	1.055		

p<0.05: significant

**Table-4: Comparison of pre and post grip strength within group A and group B**

Groups		Mean	S.D.	t value	P value
Group A	Pre Grip Strength	15.13	0.9904	-5.1667	<0.05
	Post Grip Strength	17.13	1.1254		
Group B	Pre Grip Strength	15.00	1.1952	-11.529	<0.05
	Post Grip Strength	19.80	1.08232		

p<0.05: significant

**Table- 5: Comparison of Post NPRS between Group A and Group B**

Post NRPS	Mean	S.D.	t value	p
Group A	4.4	0.9102	2.22287	<0.05
Group B	3.6	1.0555		

Unpaired sample t-test has been used to compare the mean of post NPRS between group A and group B. p<0.05: significant

on the Numeric Pain Rating Scale and grip strength, respectively. There was statistically significant decrease in NPRS and improvement in grip strength after therapy in both the groups ( $p < 0.05$ ).

On comparison of the two groups (Table 5 and 6), our findings showed that there was significantly higher improvement in pain and grip strength in Group B (patients receiving combination of cyriax therapy with low dose laser therapy) as compared to Group A ( $P < 0.05$ ).

### Discussion:

Sportspersons are predisposed to develop injuries of articular and periarticular areas depending upon many factors like time spent in active sports. [10] Tennis elbow is one such condition which is very commonly seen in active sportsmen. Cyriax physiotherapy is an effective therapeutic method in patients of lateral epicondylitis. In the present study, significant relief in pain and improvement in muscle strength was achieved in both the groups. However, out of the two groups, the group receiving cyriax with low level laser therapy had more improvement in both pain intensity & grip strength as compared to cyriax physiotherapy alone. Therefore we accept the alternate hypothesis.

Bjordal JM et al conducted a systematic review with procedural assessments and meta-analysis of Low Level Laser Therapy (LLLT) in lateral elbow tendinopathy (tennis elbow) and concluded that LLLT administered with optimal doses of 904 nm and possibly 632 nm wavelengths directly to the lateral elbow tendon insertions, seem to offer short-term pain relief and less disability in LET, both alone and in conjunction with an exercise regimen. To our knowledge, the study was to compare the efficacy of cyriax physiotherapy versus cyriax and low level laser therapy on pain and grip strength in lateral epicondylitis.<sup>11</sup>

Stasinopoulos et al compared the effectiveness of cyriax physiotherapy, supervised exercise, and treatment with polychromatic non-coherent light in managing lateral epicondylalgia. They concluded that supervised exercise consisting of static stretching and eccentric strengthening produced the largest effect in reducing pain and improving function.<sup>12</sup>

Paungmali et al found similar results with improved pain-free grip, pressure pain threshold, and sympatho-

**Table -6: Comparison of Post Grip Strength between Group A and Group B**

Post Grip strength	Mean	S.D.	t value	P value
Group A	17.13	1.1254	-6.614378	<0.05
Group B	19.8	1.08235		

$p < 0.05$ : significant

excitation following mobilization with movement directed at the elbow. It should be noted that the above studies captured outcomes only immediately following treatment; therefore, no generalization can be made regarding long-term effects. Given the results of these trials, the potential exists for a similar SNS response following the application of Cyriax physiotherapy, which may explain the technique's superiority in decreasing pain and improving pain-free grip strength.<sup>13</sup>

### Limitation of Study

- No long term follow- up data was collected past 3 weeks; therefore the long-term effects of the interventions in the present study remain unknown.
- Single centered study

**Clinical Implication:** The result of this study may help the physiotherapists to use more effective intervention, Cyriax with low level laser therapy, for reducing pain and improving grip strength in the clinical settings for lateral epicondylitis patients.

### Future Research

- Whether the effectiveness of the interventions sustains for longer periods or not, is not known yet. Future randomized trials are required to determine the long term effects of the interventions.

**Conclusion:** Cyriax physiotherapy and low level laser therapy were effective in reducing pain and improving grip strength after the treatment sessions. But benefits of cyriax physiotherapy with low level laser therapy in lateral epicondylitis patients as compared to cyriax physiotherapy alone in 3 week period are substantial. Hence, cyriax with low level laser therapy is proved to be a better treatment.

Source of Fund: Nil

Conflicting Interest: Nil

Acknowledgement: Nil

Ethical Clearance: Yes

### **References:**

1. Brotzman S B, Wilk E K Clinical orthopedic rehabilitation 2nd Ed, Pennsylvania Mosby; 1996.
2. Murtagh J Tennis elbow, *Aust Fam Physician*, 1988; **17**:90-5.
3. Allender E. Prevalence, incidence and remission rates of some common rheumatic diseases and syndromes. *Scand J Rheumatot* 1974; **3**:145-53. <https://doi.org/10.3109/03009747409097141>
4. Kroushal B, NirschlR, Current concept review: Tendinosis of elbow, clinical features and finding of histological immune histological and electron microscopic studies. *J Bone Joint Surg* 1999; **81**: 259-85. <https://doi.org/10.2106/00004623-199902000-00014>
5. Maffulli N, Wong J. Types & epidemiology of tendinopathy. *Clin Sports Med* 2003; **22**: 675 92. [https://doi.org/10.1016/S0278-5919\(03\)00004-8](https://doi.org/10.1016/S0278-5919(03)00004-8)
6. Kamein M. A rational management of tennis elbow. *Sports Med* 1990; **9**(3):173-91. <https://doi.org/10.2165/00007256-199009030-00005>
7. Sharma R, Joshi S, Singh KD, Kumar A. Normative values and effect of gender and anthropometric parameters on hand grip strength. *Int J Res Health Sci* 2015;**3**(1); 187-90.
8. Cyriax HJ, Cyriax JP. Cyriax's illustrated manual of orthopedic medicine. Oxford: Butterworth-Heinemann, 1983.
9. Hidrian, A., & Weyler, I. (2008). Comparison of the effect of cyriax cross friction massage and a nintendo wii-exercise program for the treatment of pain in chronic lateral epicondylitis. Retrieved from: <http://scriptiesonline.bib.hva.nl/document/98543>.
10. Rashid AA, Devaraj NK, Johan Abdul Kahar JA. Patellofemoral Pain: A Not So Trivial Knee Injury (A Case Report). *International Journal of Human and Health Sciences* 2019 April;**3**(2):120-2. <https://doi.org/10.31344/ijhhs.v3i2.87>
11. Bjordal JM, Lopes-Martins RA, Joensen J, Couppe C, Ljunggren AE, Stergioulas A, Johnson MI. A systematic review with procedural assessments and meta-analysis of low level laser therapy in lateral elbow tendinopathy (tennis elbow). *BMC Musculoskelet Disord*. 2008 May **29**;9:75. <https://doi.org/10.1186/1471-2474-9-75>
12. Stasinopoulos D, Stasinopoulos I. Comparison of effects of Cyriax physiotherapy, a supervised exercise programme and polarized polychromatic non-coherent light (Biopton light) for the treatment of lateral epicondylitis. *Clin Rehabil*. 2006 Jan;**20**(1):12-23. <https://doi.org/10.1191/0269215506cr921oa>
13. Paungmali A, O'Leary S, Souvlis T, Vicenzino B. Hypoalgesic and sympathoexcitatory effects of mobilization with movement for lateral epicondylalgia. *Phys Ther*. 2003 Apr;**83**(4):374-83. <https://doi.org/10.1093/ptj/83.4.374>